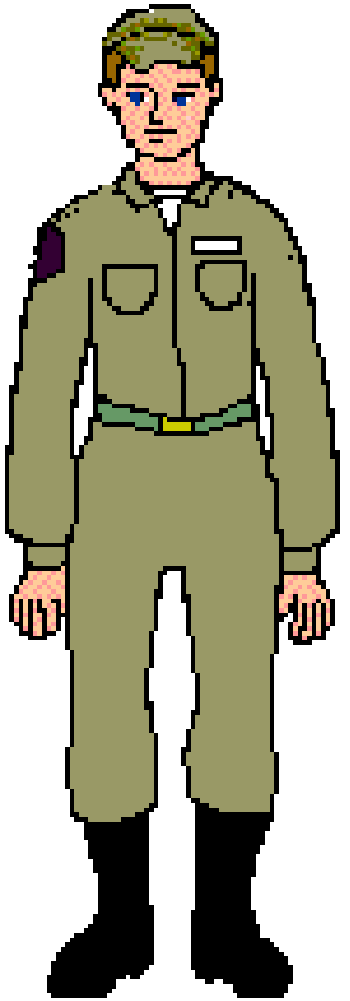
Armed Forces College of Medicine

AFCM

ANATOMY DEPARTMENT



UPPER LIMB

Nerve Injury I

By

Prof Azza Kamal

ILO

By the end of this lecture the student will be able to:

1. Describe the distribution of musculocutaneous, ulnar & median nerves.

2. Discuss the effects of injury of these nerves.

3. Predict the resulting deformity from these nerves' injuries.

KEY POINTS

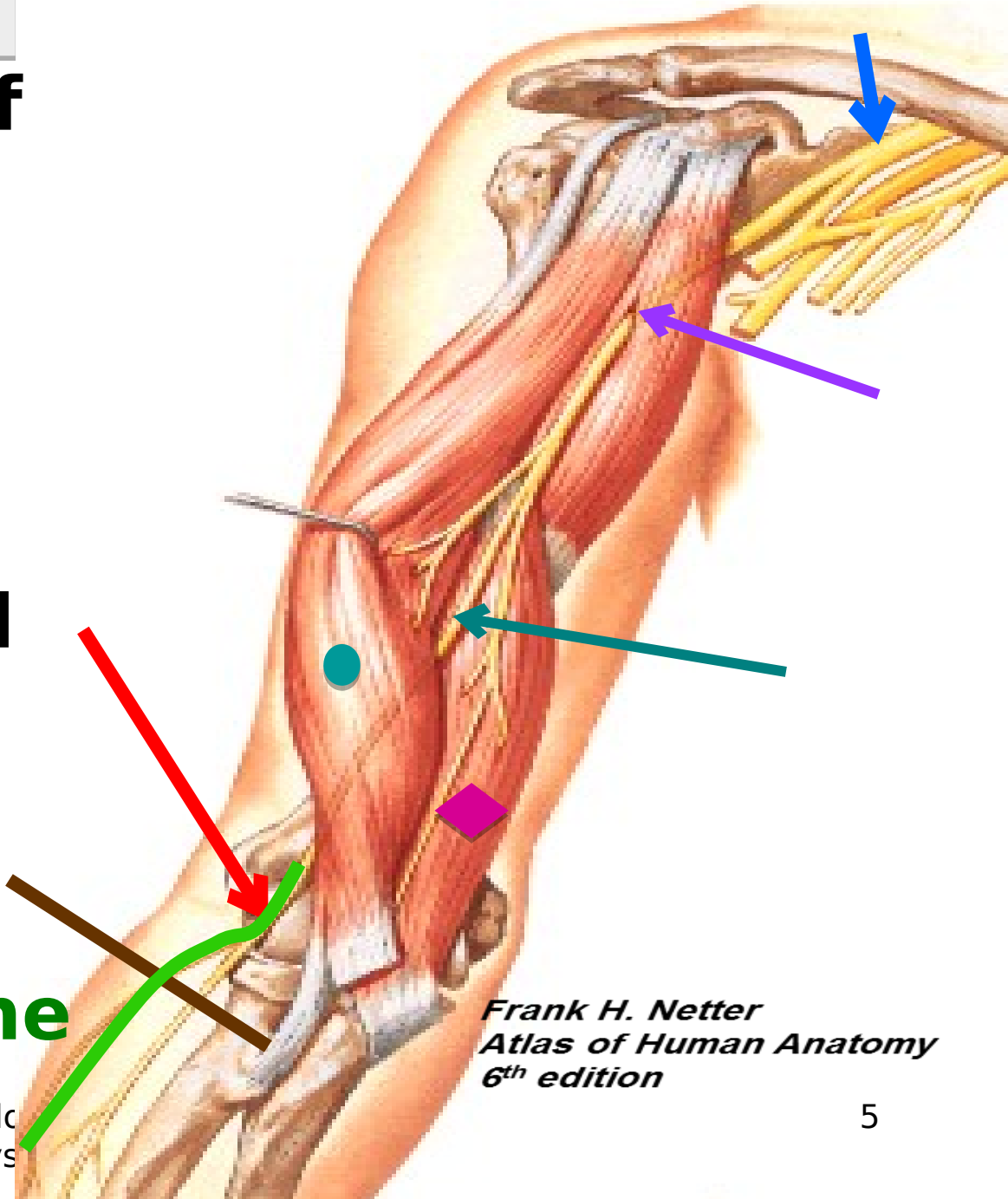
1. Branches of musculocutaneous, ulnar & median nerves.

2. Effects of injury of these nerves.

3. Deformity resulting from these nerves' injuries.

Musculocutaneous nerve:

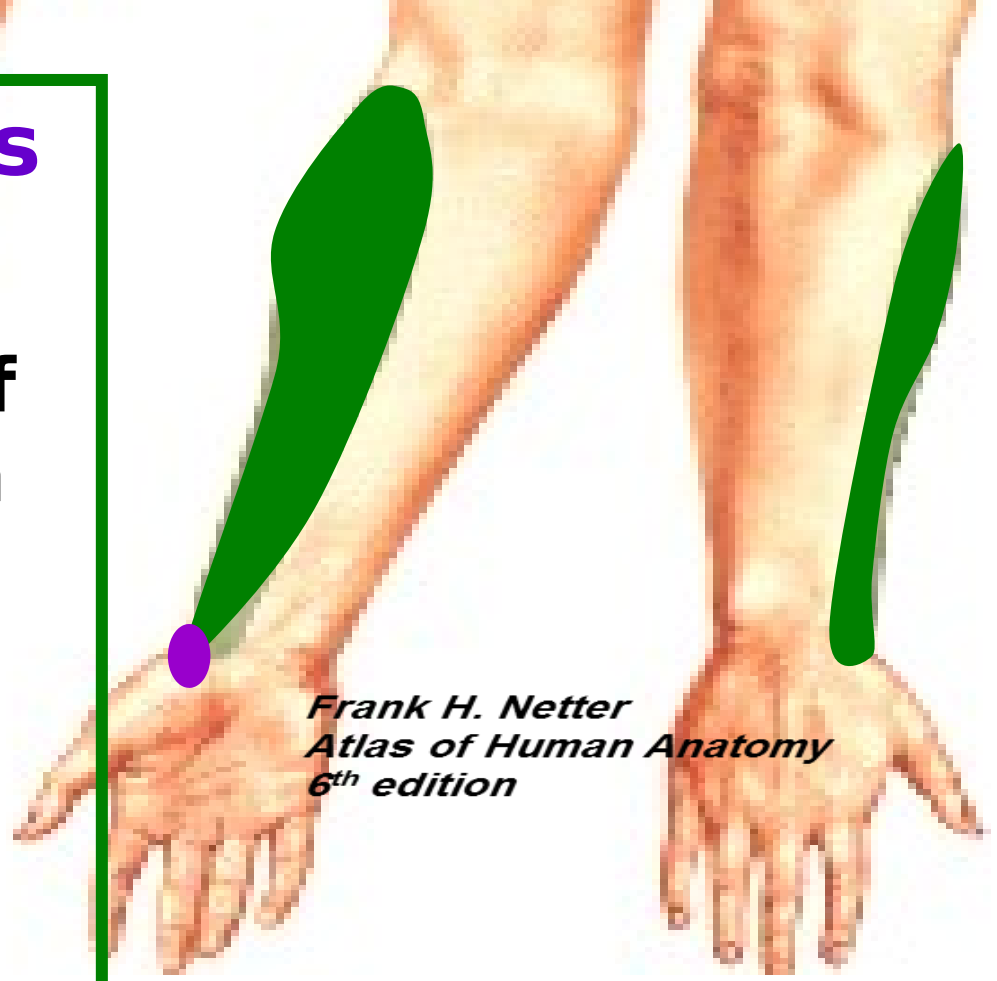
- Branch from lateral cord of brachial plexus C5,6,7
- Enters arm by piercing coracobrachialis
- Runs downwards and laterally between biceps and brachialis
- Ends lateral to biceps tendon, by becoming th lateral cutaneous nerve of the forearm.



Branches of musculocutaneous nerve:

- **Muscular :** to the three muscles of the flexor compartment of the arm **BBC {Biceps, Brachialis & Coracobrachialis}, except the lateral part of brachialis (by radial nerve)**

- **Cutaneous: lateral cut. nerve of forearm** to skin of anterolateral aspect of forearm from elbow to wrist + skin over the proximal part of thenar eminence.

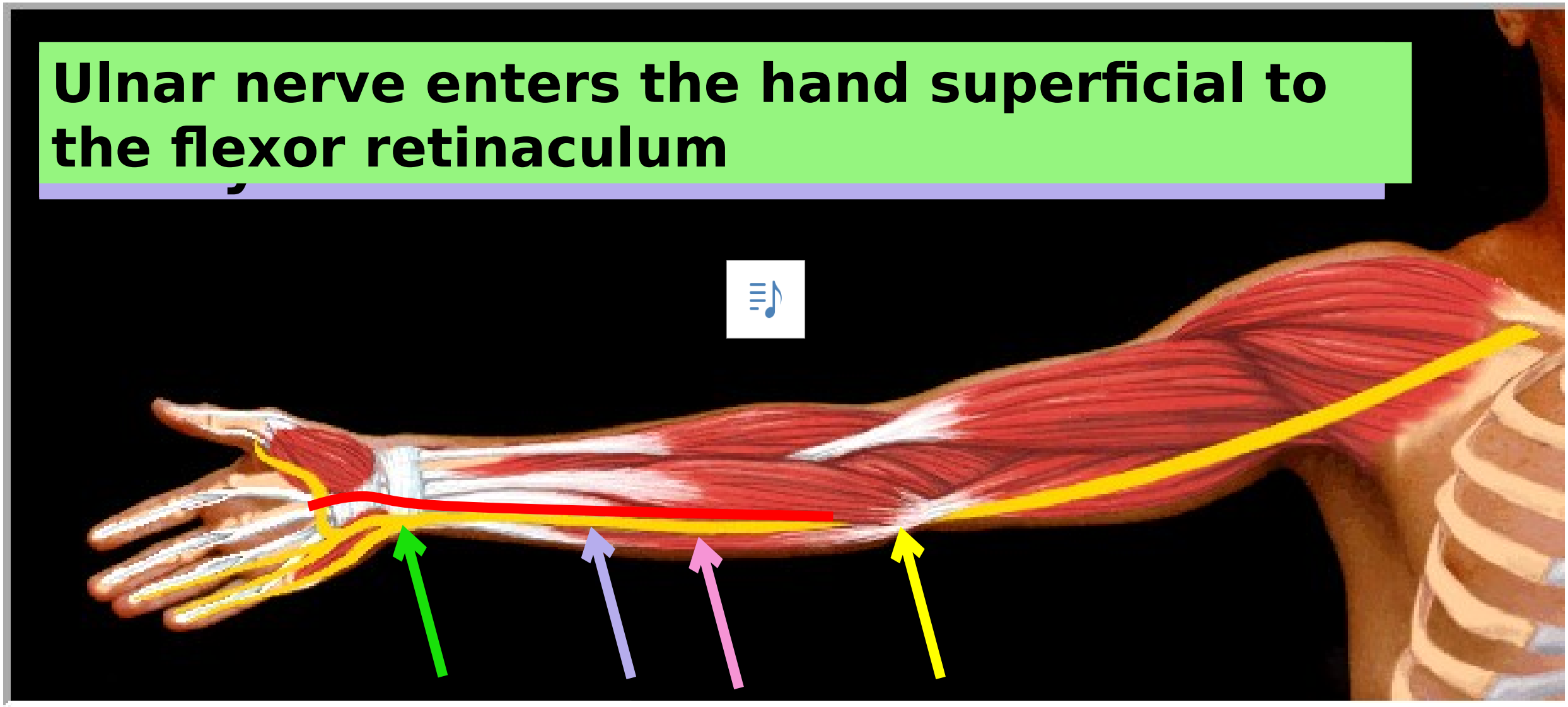


Musculocutaneous nerve is liable to injury in fractures of upper part of shaft of humerus or during repairs of these fractures. Its injury paralysis of flexors of the [redacted] ??

Biceps is paralised but supinator is working.

Loss of sensation in area supplied by musculocutaneous n.

Ulnar nerve enters the hand superficial to the flexor retinaculum



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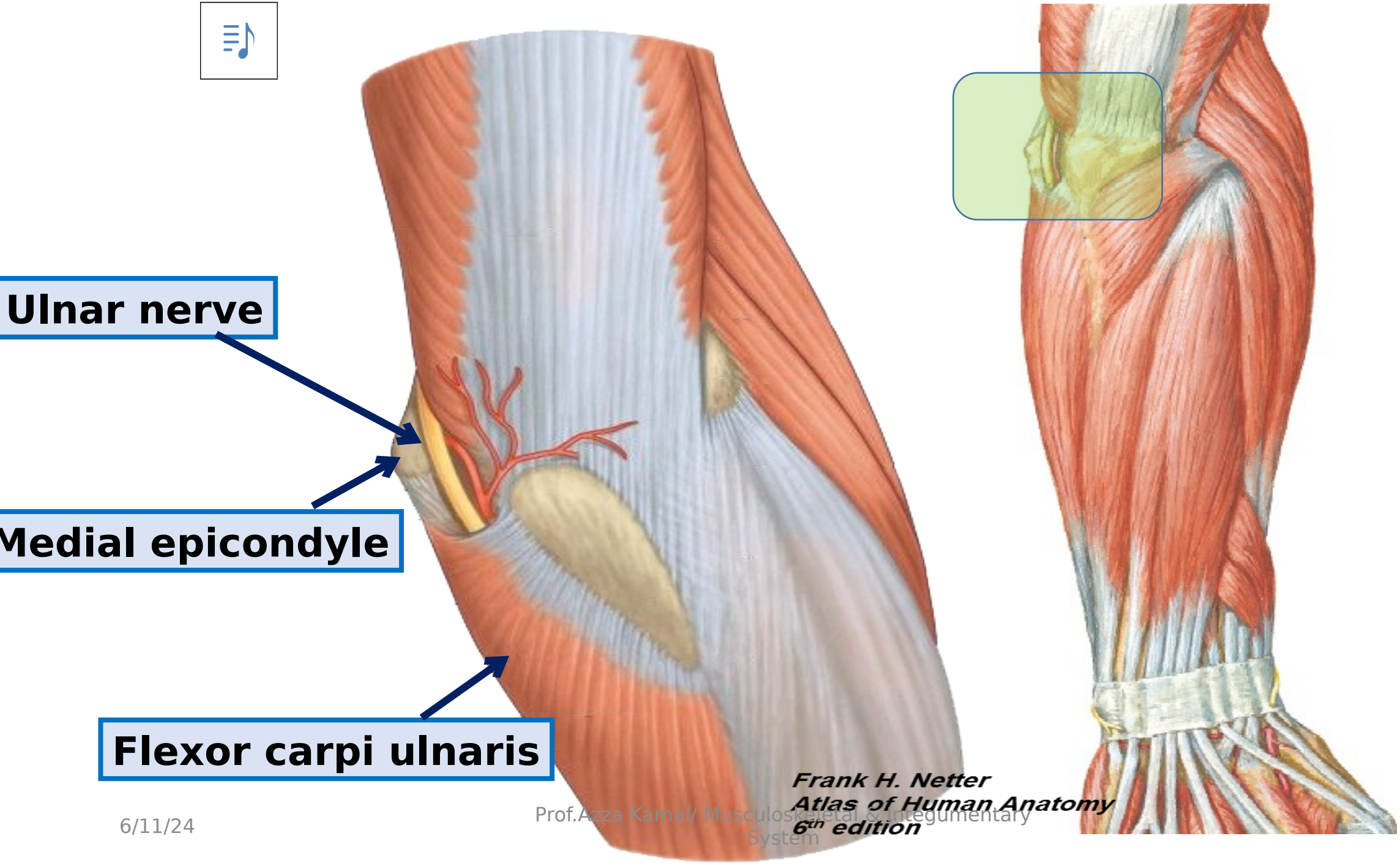
ULNAR NERVE
C7, 8, T1


Ulnar nerve
Medial epicondyle
Flexor carpi ulnaris
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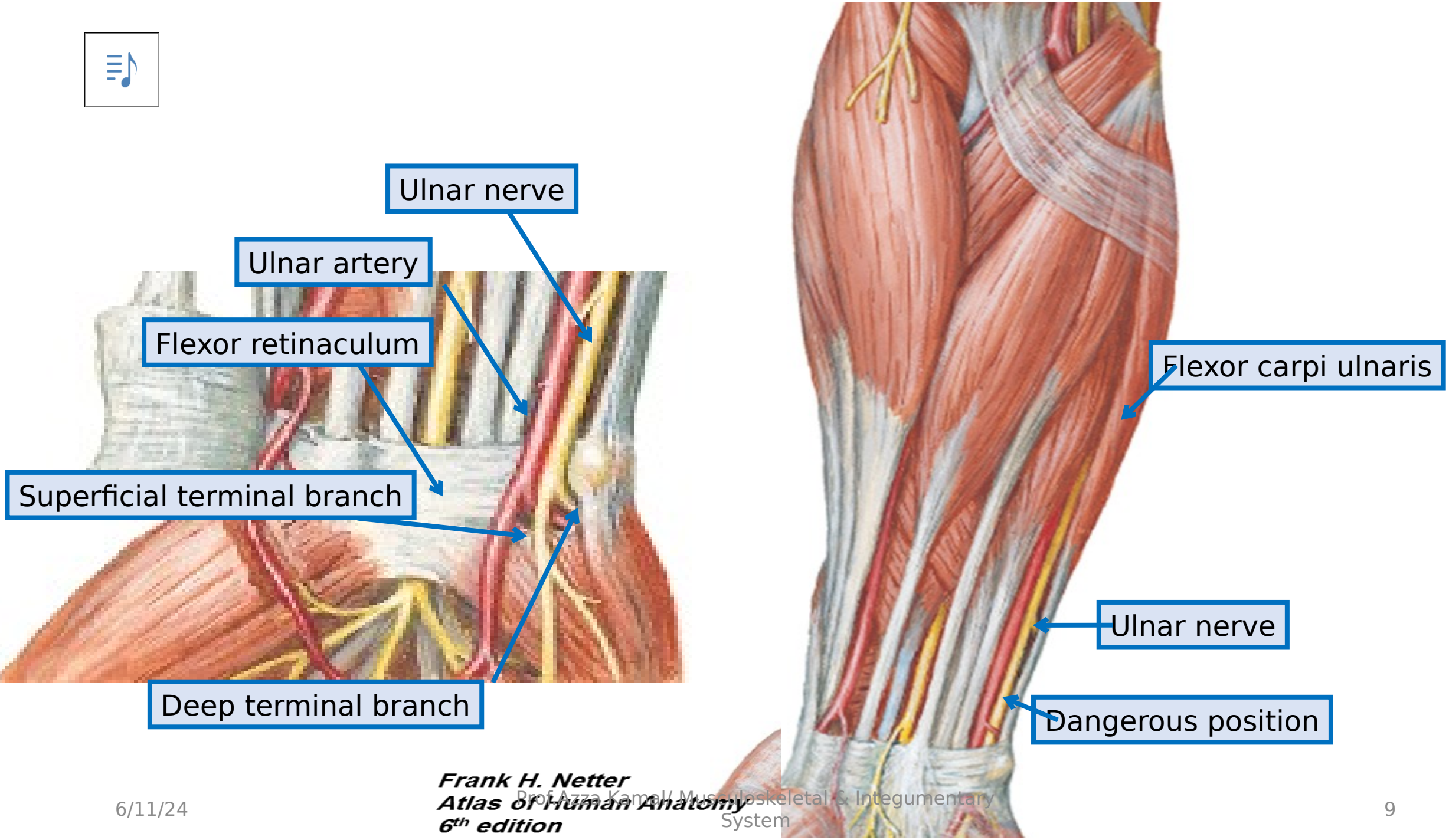

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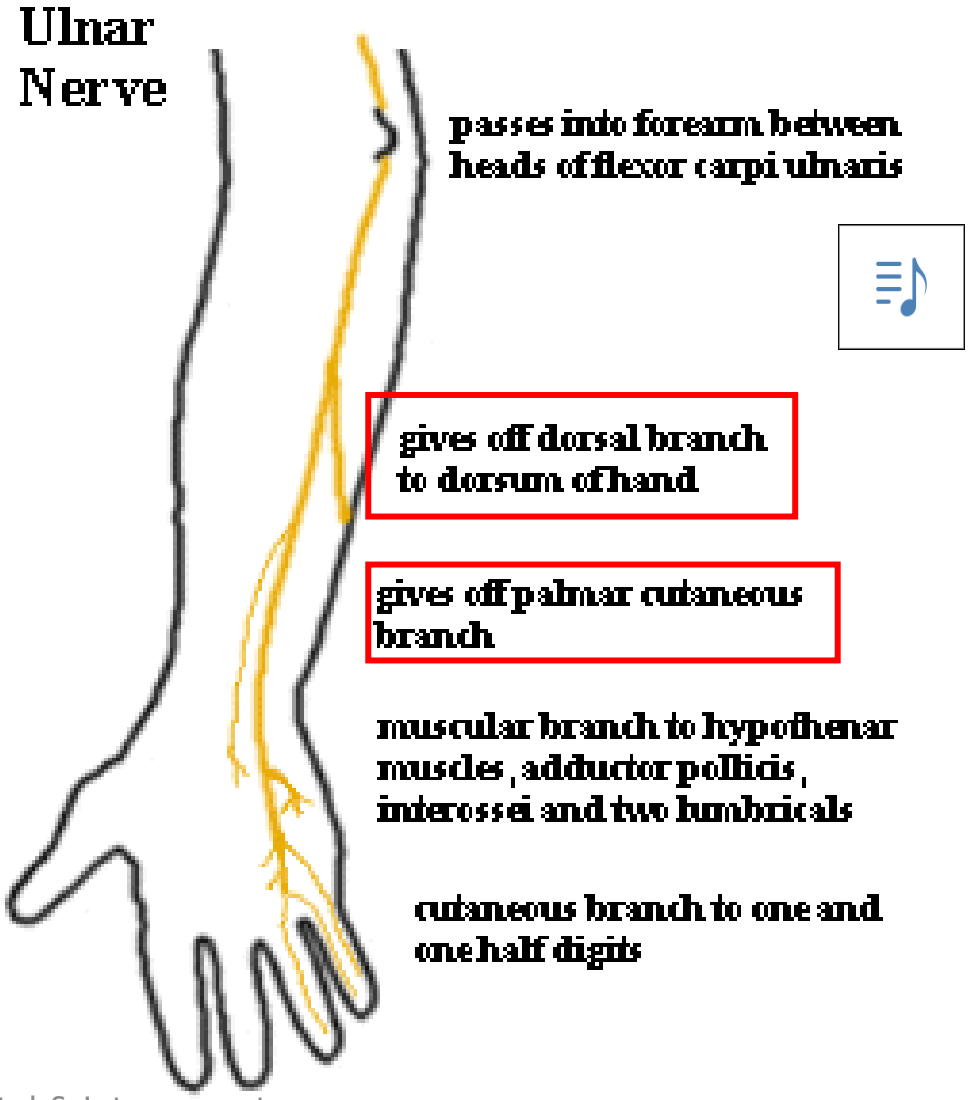
Branches of ulnar nerve in forearm:

1. **Muscular:** to flexor carpi ulnaris & medial ½ of flexor digitorum profundus
2. **Articular:** to elbow joint
3. **Cutaneous:**

- **Palmar** for skin of medial 1/3 of palm
- **Dorsal** branch for skin of medial 1/3 of dorsum of hand & dorsum of medial 1 ½ fingers



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Brs of Ulnar nerve in Forearm

- **Articular to elbow joint**
- **Muscular to flexor carpi ulnaris & medial half of flexor digitorum profundus**
- **Palmar cutaneous to skin of medial 1/3 of palm of hand**
- **Dorsal branch for skin of medial 1/3 of dorsum of hand & dorsal surface of medial 1½ fingers**

Branches of ulnar nerve in hand:

1. **Superficial branch to palmaris brevis and skin of palmar aspect of medial 1½ fingers**
2. **Deep branch to hypothenar muscles, adductor pollicis , medial 2 lumbricals and all interossei**

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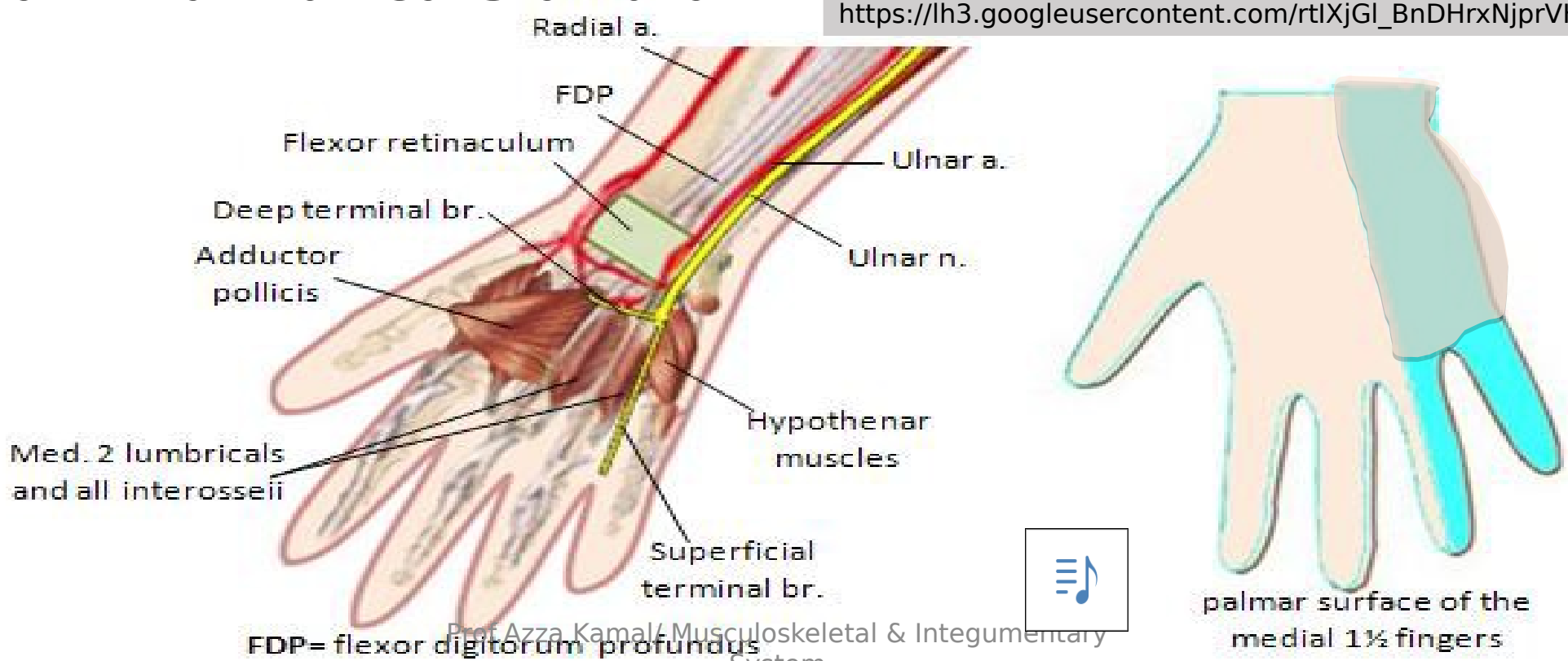
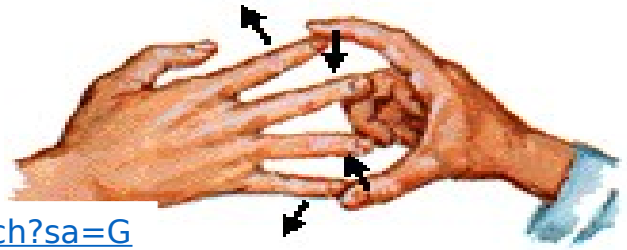


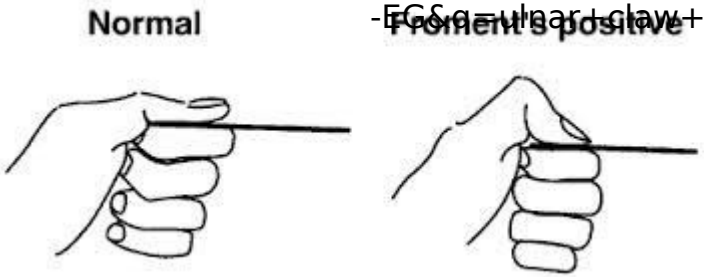
LESIONS OF ULNAR NERVE



https://www.google.com.eg/search?sa=G&hl=en-EG&q=ulnar+claw+hand

1.At wrist

- **Causes:**
  - **Stab wound**
  - **Entrapment (ulnar tunnel**
- **Effects:**
  - **Paralysis of all interossei & med. 2 lumbr**

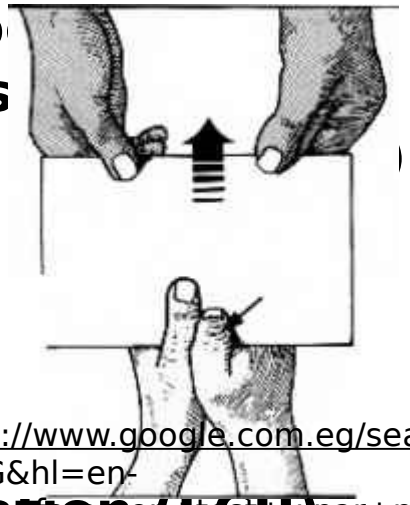


Partial claw hand (lat 2 lumbricals intact)

- **Loss of fingers abd. & add.(pap**
- **Adductor pollicis Froment's tes**

https://www.google.com.eg/search?sa=G&hl=en-EG&q=ulnar+nerve+forearm

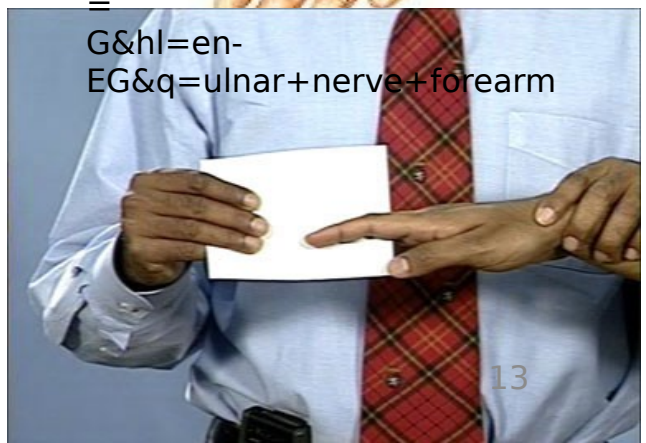
- **Anesthesia in med. 1½ fingers (pa**



https://www.google.com.eg/search?sa=G&hl=en-EG&q=ulnar+nerve+test

2.At elbow

- **Causes: fracture med. epicondyle**
- **Previous effects +**
  - **Wrist flexion weak + radial deviation (+CU)**
  - **Clawing Less apparent (ulnar paradox as med ½ FDP is paralyzed)**
  - **Anesthesia on med. 1/3 of hand & med. 1½ fingers**



Which of the following structures is most likely to be damaged in association with a fracture of the medial epicondyle of the humerus ?

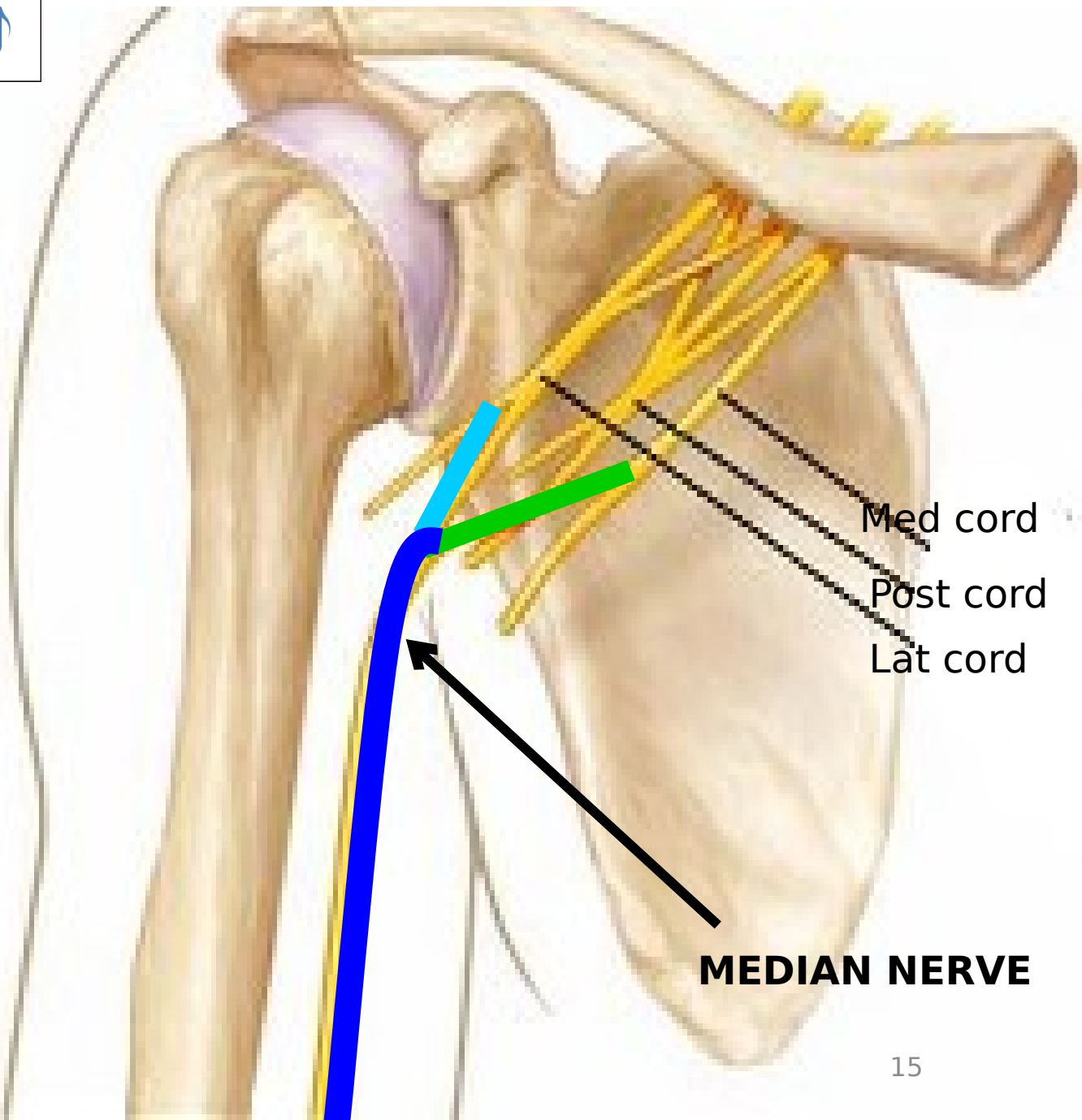
a) Radial artery
b) Ulnar nerve
c) Brachial artery
d) Ulnar artery
e) Median nerve

The Median Nerve (C5,6,7,8,T1):

- **Origin:**

Lateral root (C 5,6,7) from lateral cord of BP

Medial root (C8,T1) from medial cord of BP



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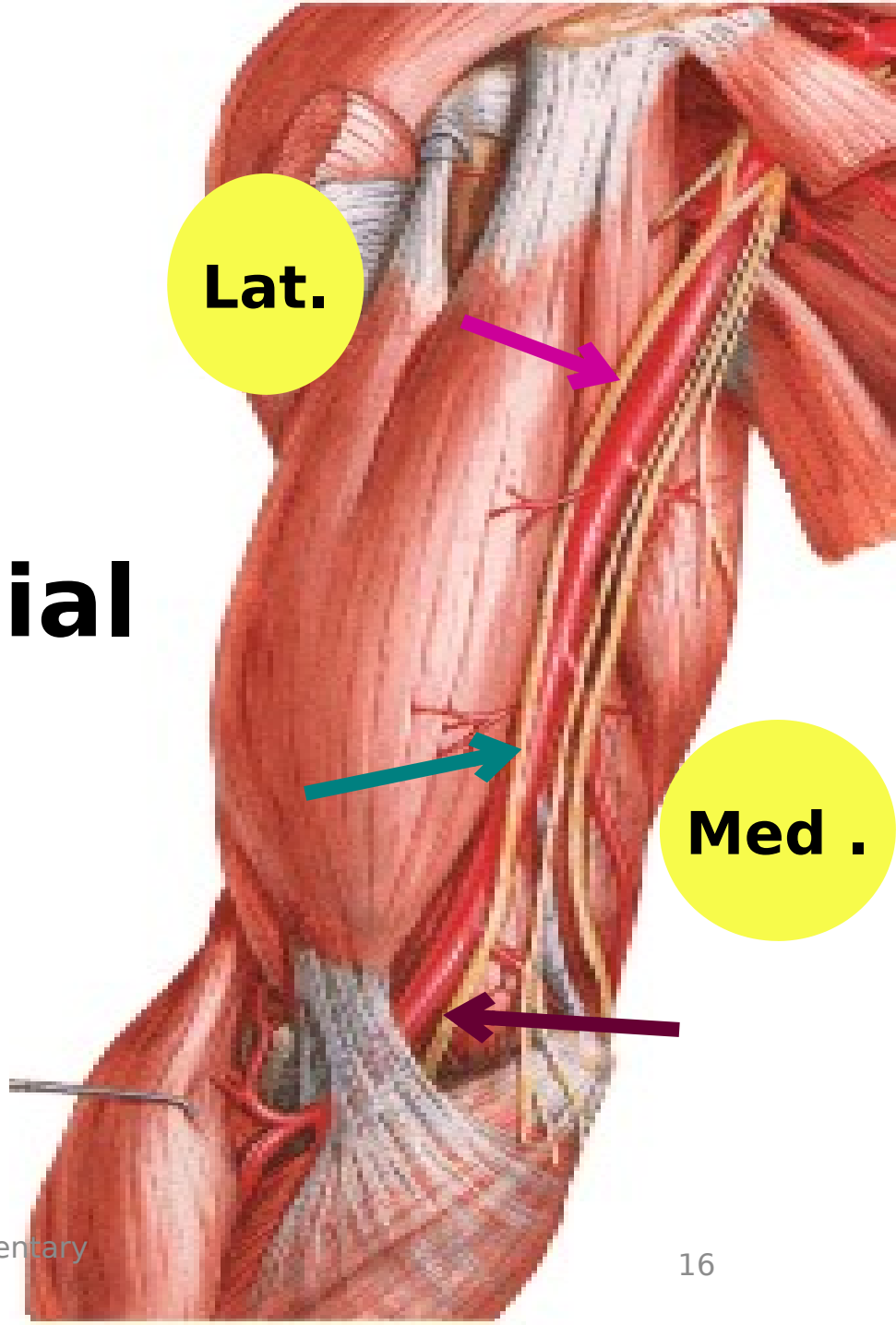
In the Arm

Lat.□ ant.□ med. to brachial artery

Median nerve gives no branches in the arm



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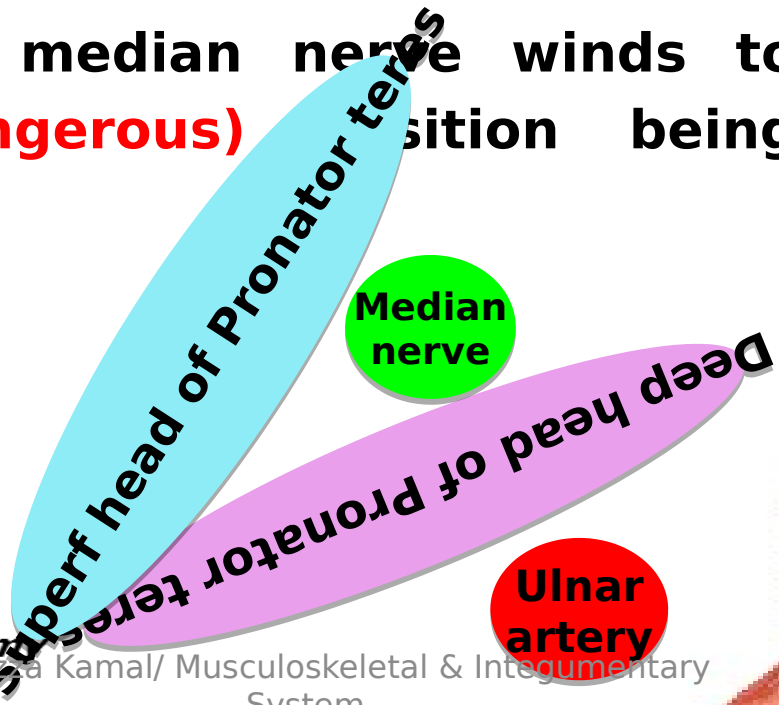
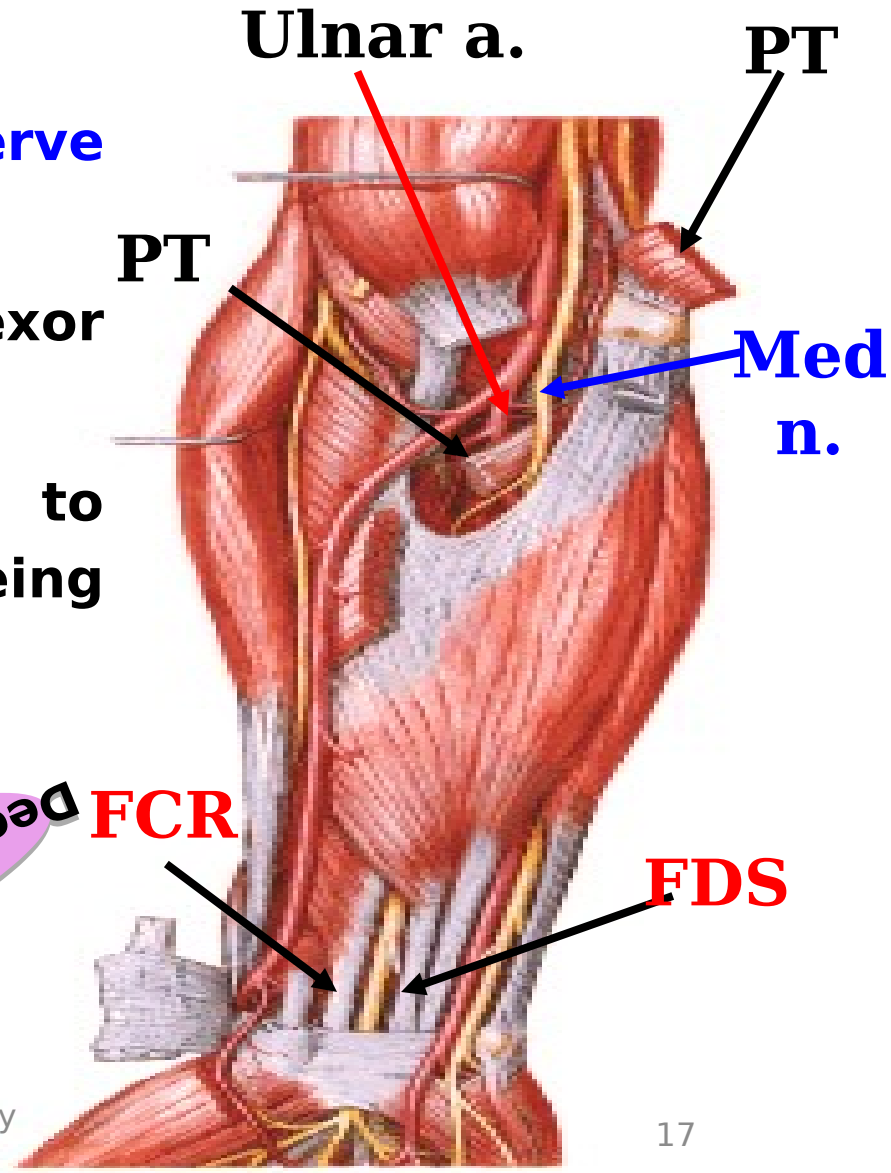
In the Forearm

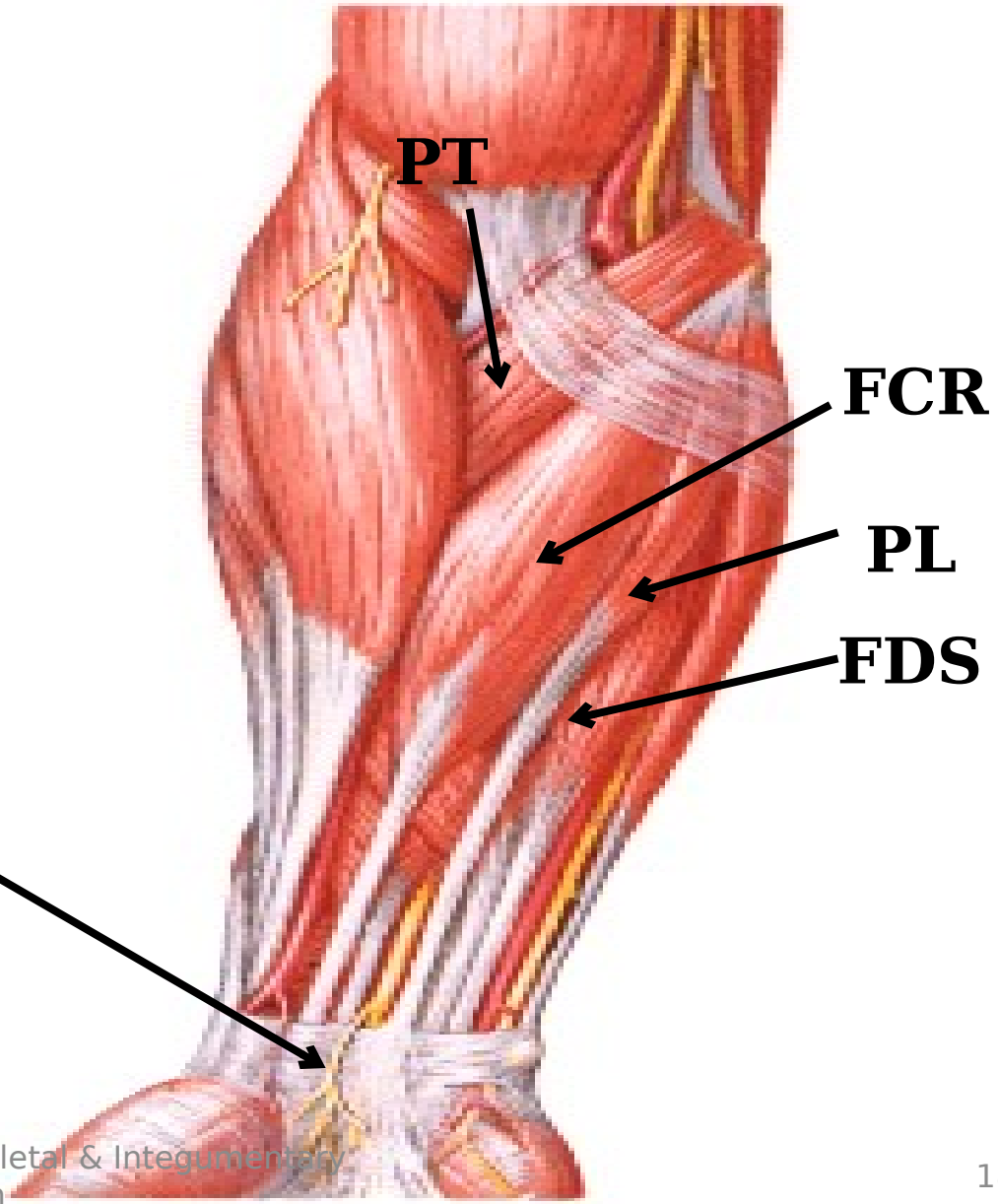
- It enters forearm between the 2 heads of pronator teres.
- Deep head of pronator teres separates median nerve from ulnar artery.
- It passes between flexor digitorum superficialis & flexor digitorum profundus.
- 2 inches above the wrist, median nerve winds to acquire a superficial (dangerous) position being covered only by skin & fascia.





Branches of the median nerve in the Forearm

1. Muscular
   - pronator teres,
   - flexor carpi radialis,
   - palmaris longus &
   - flexor digitorum superficialis
2. Articular to elbow and superior radioulnar joints.
3. Palmar cutaneous branch of median n for skin of the lateral 2/3 of the palm (hollow of palm)



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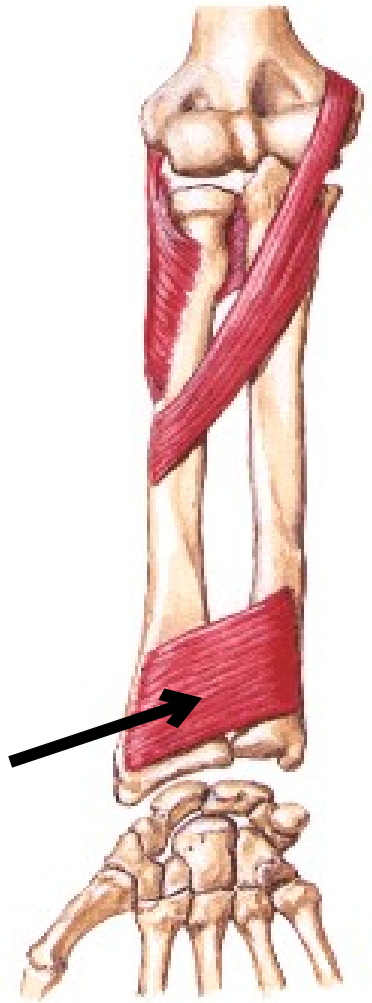
4. Anterior interosseous nerve supplies:

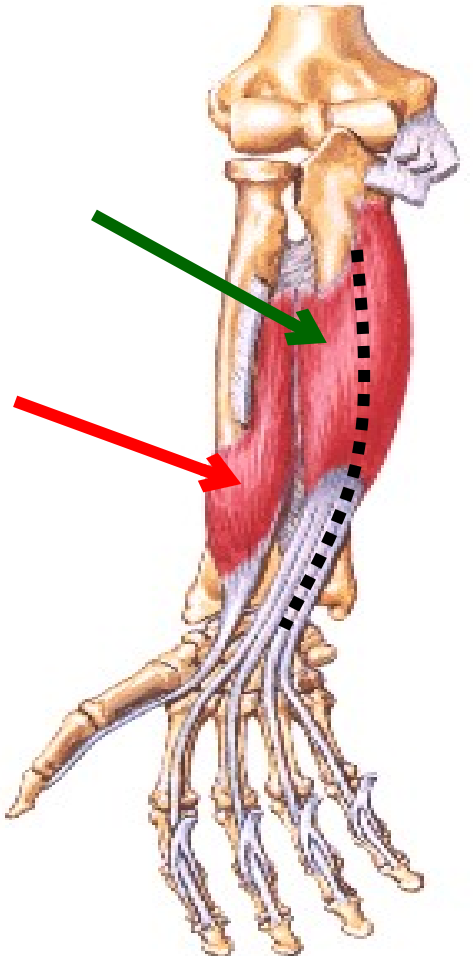
A- Muscular:

- **flexor pollicis longus,**
- **lateral ½ of flexor digitorum profundus**
- **pronator quadratus**

B- Articular branches:

to inferior radio-ulnar and wrist joints.





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Branches of Median nerve in Forearm

Muscular to pronator teres, flexor carpi radialis, palmaris longus, flexor digitorum superficialis

Articular to elbow joint & superior radioulnar joint

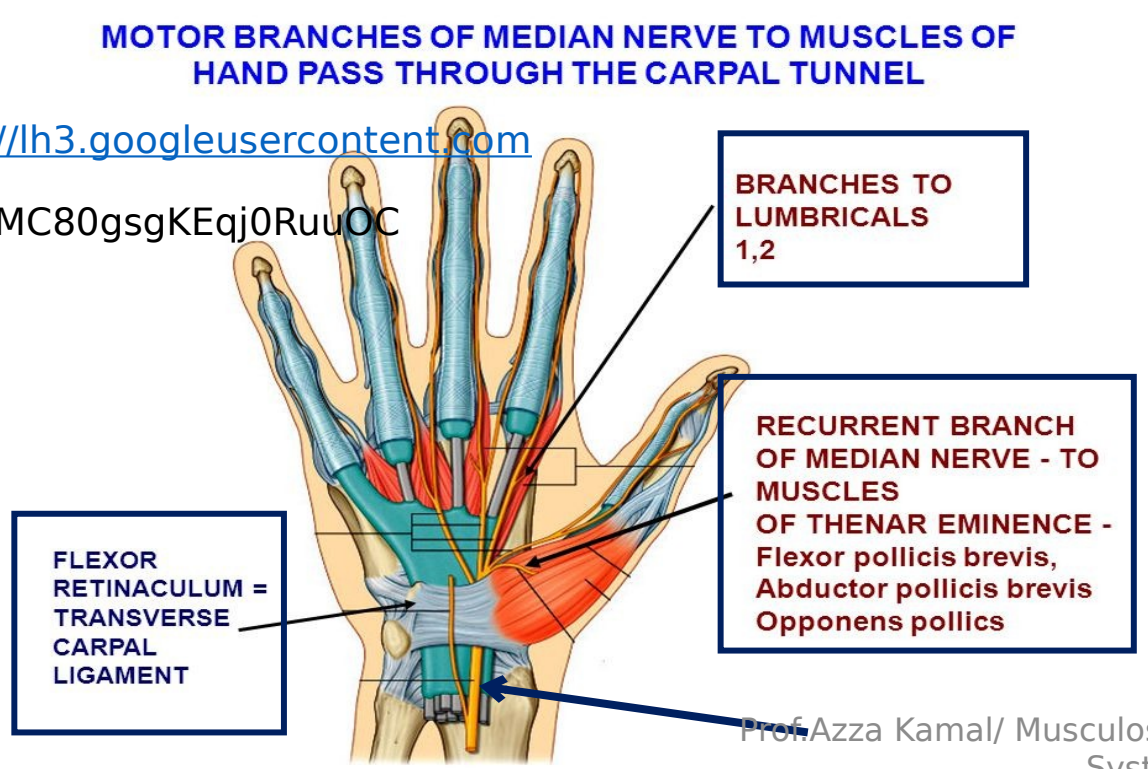
Anterior interosseous for flexor pollicis longus, pronator quadratus & lateral ½of flexor digitorum profundus

Palmar cutaneous For skin of hollow of the palm

Median nerve in the Palm:

- Enters palm **deep** to flexor retinaculum
- **Branches: LOAF (Lat 2 Lumbricals/ OP/APB/FPB)**

1. **To 3 muscles of thenar eminence + lateral 2 lumbricals**
2. **To skin of palmar aspect of lateral 3½ fingers & dorsum of terminal & middle phalanges**



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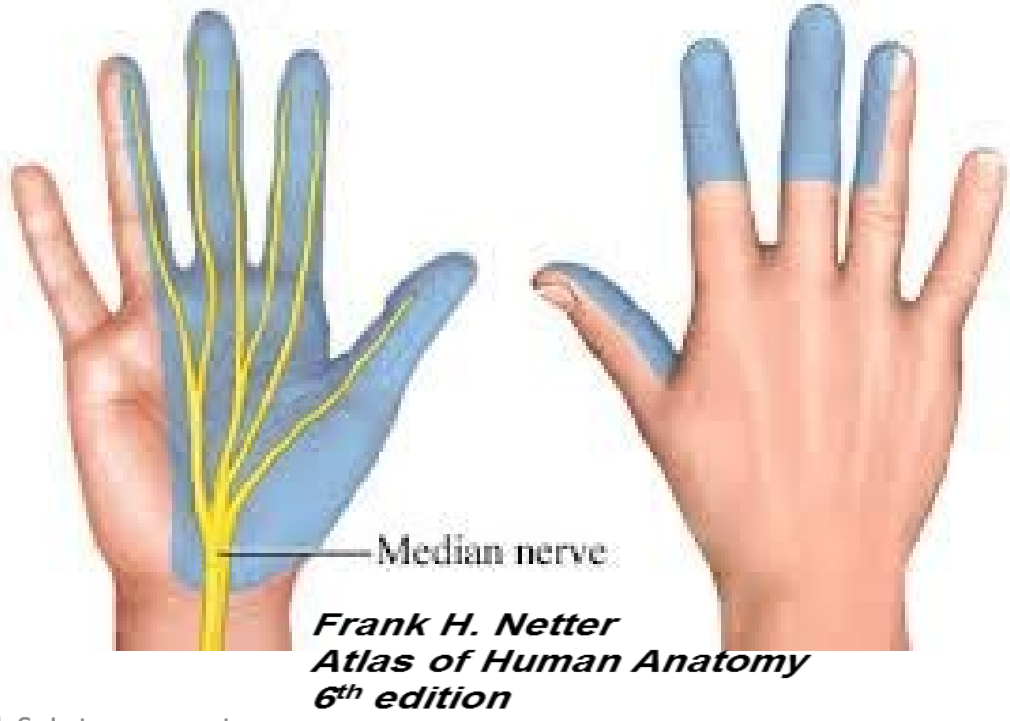

Median nerve injury:

1.At elbow:

- **Causes :** Supracondylar fracture
- **Motor effect:**
- **Pronation** lost (2 pronators)
- **Wrist flexion** weak + ulnar deviation (intact FCU)
- **Fingers flexion** ask patient to make fist can't flex index and middle Benediction (lat. ½ of FDP paralysis but med. ½ of FDP intact)
- **Thumb flexion** loss of (FPL+ Brevis)
- **Paralysis of thenar eminence muscles**

  -Flat thenar emenince,

  -Lost thumb opposition (counting test)

  -**Ape hand deformity.**

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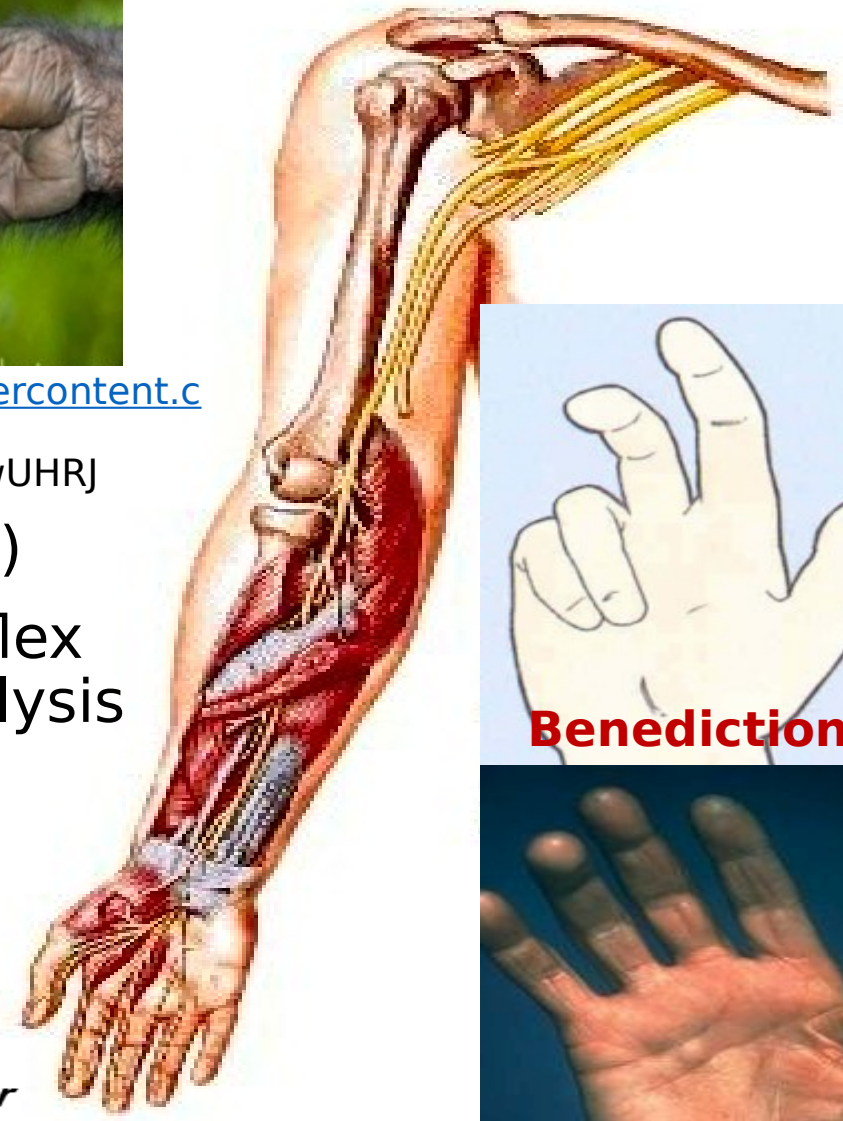

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Benediction

Ape Hand Deformity

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- **Sensory effect:**

Loss of sensation over the lateral 2/3 of the palm and the palmar surface of the lateral 3½ fingers and over their distal part on the dorsal surface.

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Median nerve injury:

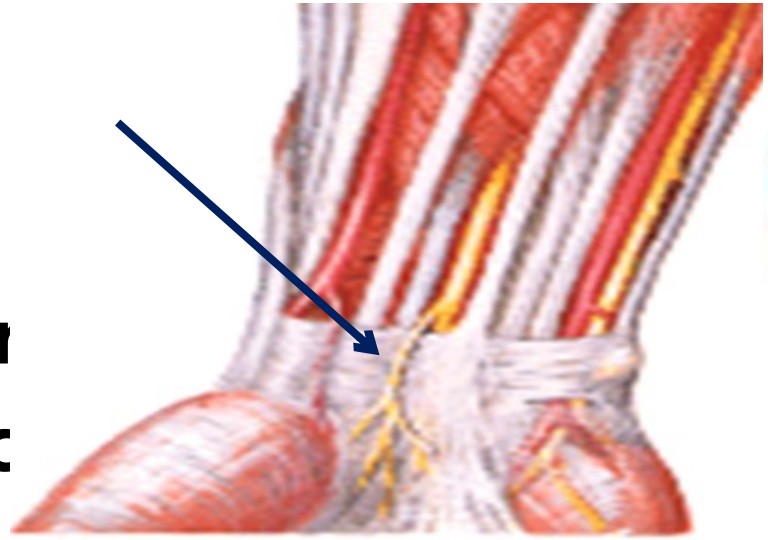
2. At wrist:

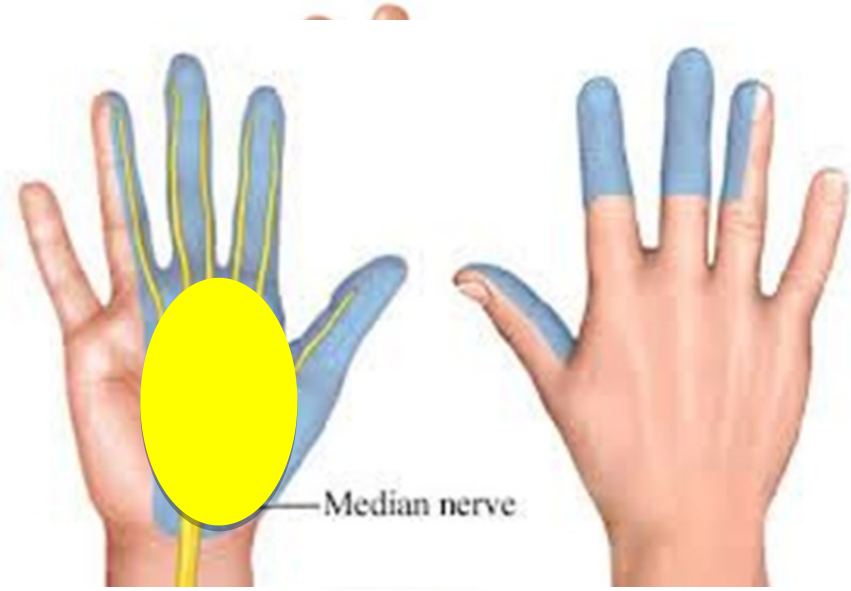
- **Causes**

  -carpal tunnel syr

  -cut wounds (suic

- **Motor effects:**
- **Paralysis of thenar eminence muscles Flat thenar emenince , lost thumb opposition and *Ape hand deformity***
- **Sensory loss in lat. 3½ fingers [palmar surface & middle & distal phalanx dorsally].**





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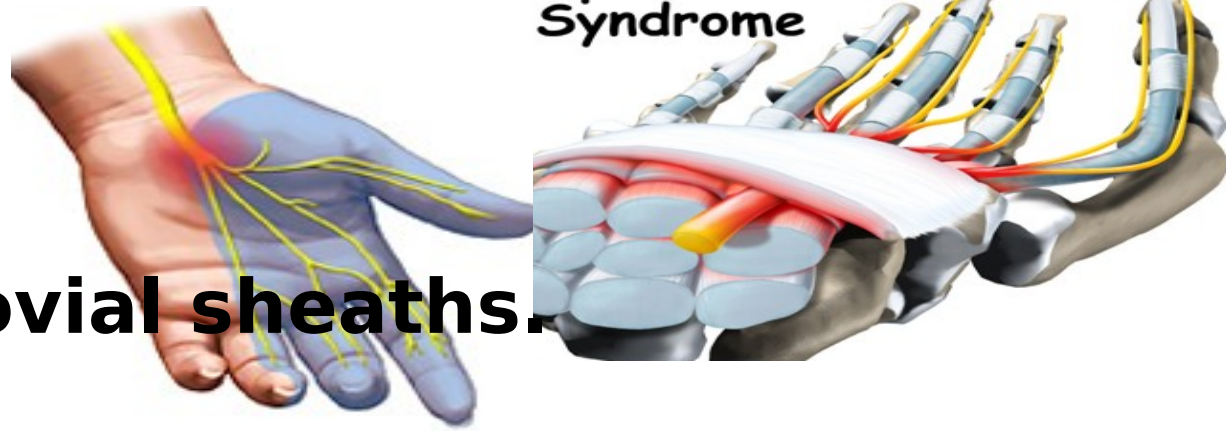
hat is carpal tunnel syndrome?

Carpal tunnel syndrome: a pathological lesion which diminishes the size of the tunnel and compresses the median nerve.



●Causes:

1- Arthritis in carpal bones.

2- Inflammation of the synovial sheaths.

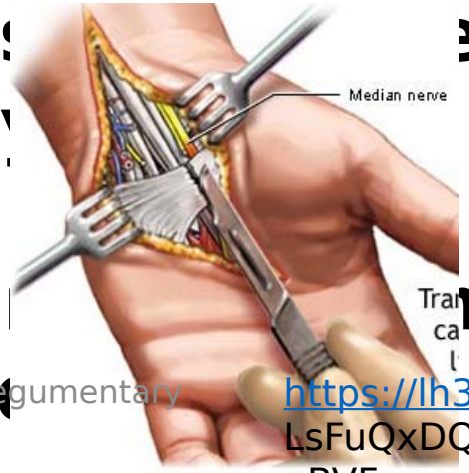
●Results:

1- Burning pain i.e. pins & needles up to sensory loss along palmar surface of the lateral 3½ fingers but **sensation is normal in hollow of palm.**

3- Weakness and flattening of mus enar eminence with ape hand deformity

●Treatment:

longitudinal incision of the flexor m to relieve compression of the me



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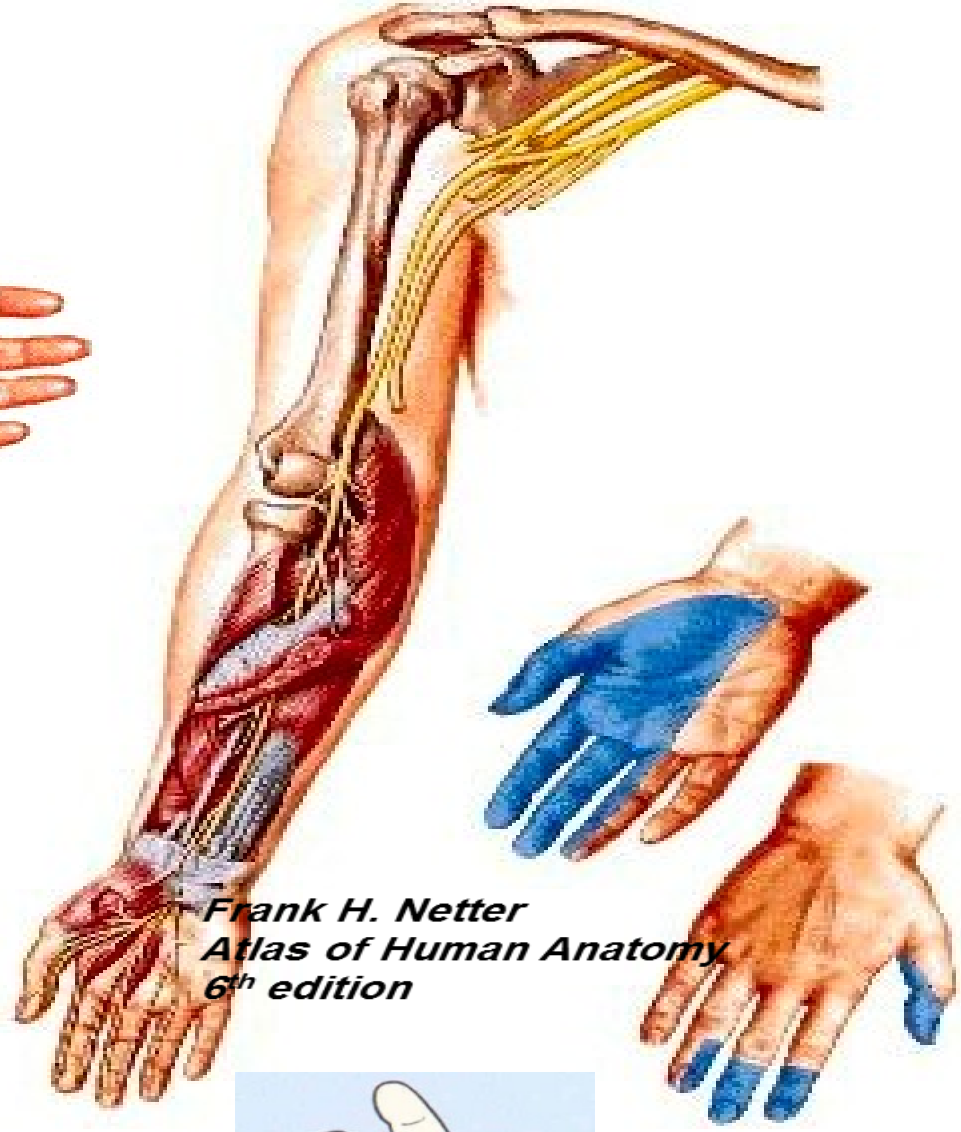
Now Let's Summarize
LESIONS OF MEDIAN NERVE



1.At wrist:

- **Causes**
  - **carpal tunnel syndrome**
  - **cut wounds (suicide)**
- **Effects: "Ape hand"**
  - **Paralysis of thenars**
    1. **Flat thenar emenince**
    2. **Lost thumb opposition**
    3. **Weak thumb abduction & flexion**
  - **Sensory loss in lat. 3½ fingers [palmar surface & middle & distal phalanges dorsally].**

2.At elbow:

- **Causes**
  - **Supracondylar fracture**
- **Previous effects +**
  - **Pronation lost (2 pronators)**
  - **Wrist flexion weak + ulnar deviation (FCU intact)**
  - **Fingers flexion ask patient to make a fist he can't flex index & middle due to paralysis of lat ½ of FDP Benidiction**
  - **Thumb flexion lost**
  - **Sensory loss : lat. 2/3 of palm + lat. 3½ fingers [palmar surface & middle & distal phalanges dorsally].**

A patient arrived to the hospital after receiving a deep cut in the front of his forearm just above the wrist. He was diagnosed with a double ulnar & median nerve injury. Which of the following is the deformity you expect to see in this patient?

a) Partial claw hand
b) Complete claw hand
c) Winging of scapula
d) Wrist and finger drop
e) Flat shoulder

Deformity	Nerve Injured
Winging of scapula	Long thoracic nerve
Flat shoulder	Axillary nerve
Ape hand	Median nerve
Partial claw hand	Ulnar nerve
Complete claw hand	Median and Ulnar
Waiter’s tip position	Upper trunk of BP (Erb’s Paralysis)
Complete claw hand	Lower trunk of BP (Klumpke’s Paralysis)

Suggested Textbook
Clinical Anatomy for Medical Students/
Richard S. Snell
Third Edition/ Pages 532-537